IKOSA®
Application Documentation

Application Name	Ki-67 Quantification Breast Cancer
Version	1.0.0
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Input Image(s)	Single Image (RGB) - Standard or Whole Slide Image
Input Parameter(s)	None
Keywords	pathology, ihc, ki67, ki-67, nuclei, microscopy, mamma, breast, tissue, detection, tumor, oncology, carcinoma
Short Description	Detection of tumor cell nuclei in immunohistochemically (IHC) stained sections of human breast cancer. Counting of positively (brown) and negatively (blue) stained nuclei and calculation of positive/negative ratio.
References / Literature	Reference department: Diagnostic and Research Institute of Pathology, Medical University of Graz, Dr.med.univ. Martin Asslaber
Important Information	**Research Use Only!** This application is not certified as a medical device and must not be used for diagnostic or therapeutic purposes.

Table of Contents

IKOSA® Image Analysis

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Application Description

This application automatically detects and counts tumor cell nuclei in immunohistochemically (IHC) stained sections of human breast cancer. Positively (brown) and negatively (blue) stained nuclei are counted separately. The ratio of the detected positively and negatively stained nuclei is calculated. The application was developed and tested with microscopy images of human tissue sections.

In the following, the requirements for an accurate analysis are given and the output of the applications is described.

Further Information

If you have any questions regarding this application or if you want to know if your specific type of images can be analyzed, please get in touch with us at support@kmlvision.com. Also, if you have requests or ideas regarding additional image analysis applications that you would require, please get in touch with us at support@kmlvision.com.

For more information, please visit www.ikosa.ai.

Requirements

Input Image(s)

Input for this application is the following image data:

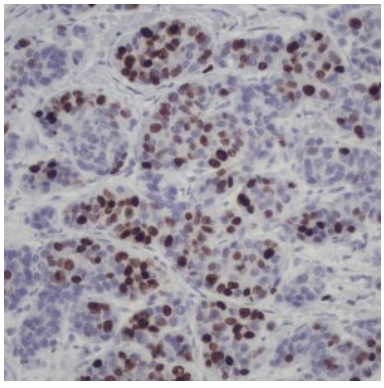
No.	Image data	Type of image	Color Channels	Color Depth (per channel)	Size [Px]	Resolution [µm/Px]
#1	Single image	Standard or Whole Slide	3 (RGB)	8 Bit	Min: 640 x 480 Max: 7680 x 5760 Min: 640 x 480 Max: 76800 x 57600	Typically: 0.3 - 0.5

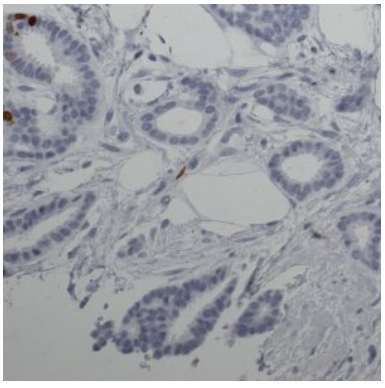
Image Content: Microscopy image of IHC Ki-67 stained sample, typically taken with 20x magnification.

Additional requirements:

- For imaging, UV and IR filters should be used.
- Nuclei must have sizes (diameters) in the range of 25-90 Pixels for the algorithm to detect the nuclei.

Examples:





For all images, the following requirements apply:

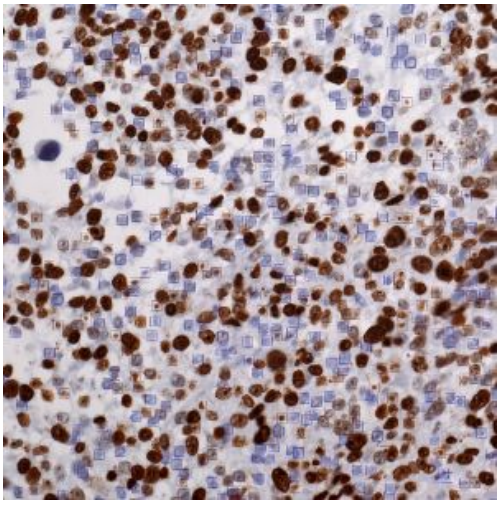
- The illumination must be constant throughout the image(s).
- The sample must be in focus, i.e. no blurry regions in image(s).

Input Parameter(s)

No additional input parameters are required for this application.

Results

Files

No.	File type	Content and Description
1	csv	*results.csv:* A csv file containing global analysis results for the input image.
2	jpg	*results_visualization.jpg:* A visualization of the analysis: This file is only generated for standard images (not for Whole Slide Images).  • Brown and blue nuclei are visualized using orange and blue rectangles, respectively.
3	json	*annotation_results.json:* JSON file containing positions of detected nuclei. The position is measured from the left upper corner (1,1) of the image.

Description of files

File no. 1 (*results.csv*): Single csv-file with the following content:

Col. no.	Column name	Examples	Value range	Description
1	nuclei count	1232	0 -	Number of detected nuclei.
2	blue nuclei count	386	0 -	Number of detected blue nuclei.
3	brown nuclei count	846	0 -	Number of detected brown nuclei.
4	ratio brown/blue nuclei	2.19	0 - inf	Number of brown nuclei divided by the number of blue nuclei. if blue=0 the result is "inf" (infinity).